

Amendments to Claims

This listing of claims will replace all prior revisions and listings of claims in this application.

Listing of Claims

- 1 1. **(Currently Amended)** A method comprising:
 - 2 generating a phase-shift keyed optical signal; and
 - 3 propagating the phase shift keyed optical signal through a semiconductor optical
 - 4 amplifier in deep saturation, wherein $-4\text{dBm} < P_{IN} < 4\text{dBm}$, such that an optical
 - 5 signal exhibiting a regulated, -amplified optical power is produced;
 - 6 wherein the amplified optical power is regulated to a saturation output power such that
 - 7 $\Delta P_{OUT}(\text{dB})/\Delta P_{IN}(\text{dB})$ of the optical amplifier is less than about 0.25, wherein P_{OUT} is
 - 8 the power of the optical signal output from the amplifier, and P_{IN} is the power of the
 - 9 optical signal input into the amplifier.
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- 1 2. **(Previously presented)** The method of claim 1, wherein the amplified optical power is
- 2 regulated to about the saturation output power of the semiconductor optical amplifier.
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- 1 3. **(Previously Presented)** The method of claim 1, wherein a gain recovery time of the
- 2 optical amplifier is larger than the bit period of the optical signal.
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- 1 4. **(Original)** The method of claim 1, wherein the optical signal has a data-independent
- 2 intensity profile.
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- 1 5. **(Original)** The method of claim 1 wherein the optical signal is RZ-DPSK signal.
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- 1 6. **(Original)** The method of claim 1, wherein the optical signal is an $\pi/2$ -DPSK signal.
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1 7. **(Original)** The method of claim 1, wherein the optical signal is a constant-intensity DPSK
2 signal.

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1 8. **(Original)** The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

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9. **(Cancelled)**

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1 10. **(Currently Amended)** A method for optical limiting amplification comprising:

2 inputting a phase-shift keyed optical signal having a data independent intensity profile
3 into a semiconductor optical amplifier in a deep saturation regime wherein $-4\text{dBm} <$
4 $P_{\text{IN}} < 4\text{dBm}$ such that an optical signal exhibiting a regulated, amplified optical
5 power is produced and output, wherein $\Delta P_{\text{OUT}}(\text{dB}) / \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25,
6 where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the
7 power of the optical signal input into the amplifier.

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1 11. **(Previously Presented)** The method of claim 10, wherein a gain recovery time of the
2 optical amplifier is larger than the bit period of the optical signal.

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1 12. **(Original)** The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

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1 13. **(Original)** The method of claim 10, wherein the optical signal is an $\pi/2$ -DPSK signal.

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1 14. **(Original)** The method of claim 10, wherein the optical signal is a constant-intensity
2 DPSK signal.

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1 15. **(Original)** The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

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16. **(Withdrawn)**

1 17. (Currently Amended) An optical signal processor apparatus comprising:
2 a semiconductor optical amplifier device adapted to operate in deep saturation , wherein -
3 $4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$, and to receive an RZ-DPSK optical signal having an amplitude-
4 shift keyed optical label portion, such that the optical label portion of the signal is
5 removed upon propagation through the semiconductor optical amplifier device;
6 wherein $\Delta P_{\text{OUT}}(\text{dB})/ \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical
7 signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the
8 amplifiers.

18. (Withdrawn)

1 19. (Currently Amended) An optical communication system for transmitting multi-channel
2 phase-shift keyed optical signals comprising:
3 a plurality of semiconductor optical amplifiers,
4 wherein the system is adapted to transmit the optical signals such that the plurality of
5 semiconductor optical amplifiers operate in deep saturation amplifier in a deep saturation
6 regime wherein $-4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$ so as to provide optical power equalization of a
7 plurality of channels of the multi-channel optical signals,
8 wherein $\Delta P_{\text{OUT}}(\text{dB})/ \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical
9 signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the
10 amplifiers.

1 20. (Currently Amended) An apparatus comprising:
2 a means for generating a phase-shift keyed optical signal; and
3 a means for propagating the optical signal through a semiconductor optical amplifier in deep
4 saturation wherein $-4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$ to regulate the amplified optical power;
5 wherein $\Delta P_{\text{OUT}}(\text{dB})/ \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical
6 signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the
7 amplifiers.